# The Quantitative Ice: A Comprehensive Treatise on Advanced Hockey Analytics, Micro-Statistics, and Data Architecture

## 1. Introduction: The Statistical Evolution of the Frozen Game

The history of ice hockey analysis is a trajectory moving from the rudimentary to the revelatory. For decades, the understanding of player value was confined to the "back of the hockey card"—Goals, Assists, Points, and the notoriously flawed Plus-Minus. These counting statistics, while capturing the finality of scoring events, failed to account for the stochastic nature of a sport played on a frictionless surface where a vulcanized rubber disc moves at 100 miles per hour. They measured outcomes, not processes. They rewarded the finishers of plays but often ignored the drivers of possession and the suppressors of opposition chances.

The modern era of hockey analytics, often referred to as the "advanced stats" revolution, began with the realization that shot volume acts as a superior predictor of future success than goal differential. This insight, birthed on blogs and forums and now institutionalized in NHL front offices, shifted the focus from observing the scoreboard to observing the flow of play. Today, that evolution has reached a new zenith with the advent of Computer Vision, Optical Tracking, and Player Tracking technology (NHL EDGE). We no longer just count shots; we measure the velocity of the skater, the torque of the stick, the geometry of the passing lane, and the probability of a pass completion down to the decimal.

This report serves as an exhaustive technical manual and strategic guide to this new landscape. It details the mathematical definitions, calculation methodologies, and data requirements for the entire spectrum of modern hockey metrics—from the foundational possession proxies of Corsi and Fenwick to the complex machine-learning models of Expected Goals (xG) and Wins Above Replacement (WAR), and finally to the granular microstats and tracking data that define the cutting edge of the sport.

## 2. The Foundation of Possession: Shot Attempt Metrics

Before one can understand the complexity of expected value models, one must understand the bedrock upon which they are built: the measurement of territorial dominance through shot attempts. The fundamental premise of possession analytics is that a team cannot shoot the puck if they do not have it. Therefore, the differential of shot attempts between two teams serves as a robust proxy for possession time and, crucially, is more predictive of future goal-scoring share than past goal-scoring share.

### 2.1 Corsi (SAT): The Total Volume Metric

Originating from Buffalo Sabres goaltending coach Jim Corsi, who sought to measure a goalie's workload, the metric was adapted by the analytics community to measure skater and team performance. In the NHL's official nomenclature, this is referred to as **SAT (Shot Attempts)**.

Definition and Components

Corsi represents the sum total of all shot attempts directed toward the net, regardless of whether they result in a goal, a save, a miss, or a block. It is a binary indicator of offensive presence: if a specific player is on the ice and their team is generating Corsi events, they are likely driving play.

The mathematical formulation for a team's Corsi count during a game or shift is:

$$\text{Corsi} = \text{Goals} + \text{Saves (Shots on Goal)} + \text{Missed Shots} + \text{Blocked Shots}$$

Variations and Contextual Calculations

The raw count of Corsi events is rarely useful in isolation due to the variance in time on ice (TOI) among players. Consequently, the metric is derived into rates and percentages to allow for comparative analysis across the league.

* Corsi For Percentage (CF%): This is the most ubiquitous "advanced stat." It measures the ratio of shot attempts taken by a player's team versus those allowed while that player is on the ice.  
    
  $$\text{CF\%} = \frac{\text{CF}}{\text{CF} + \text{CA}}$$
  + *Interpretation:* A CF% of 50% implies the player breaks even in possession. In the modern NHL, elite possession drivers typically sustain a CF% above 55%, while replacement-level players often fall below 45%. A player with a CF% of 60% is effectively tilting the ice, ensuring that for every 10 shot attempts during their shifts, 6 are directed at the opponent's net.1
* Relative Corsi (Rel CF%): This metric isolates a player's performance from the quality of their team. It subtracts the team's CF% when the player is off the ice from the CF% when they are on the ice.  
    
  $$\text{Rel CF\%} = \text{CF\%}\_{\text{On-Ice}} - \text{CF\%}\_{\text{Off-Ice}}$$
  + *Strategic Insight:* Relative stats are essential for evaluating good players on bad teams. If a team is a 45% possession team overall, but jumps to 50% when a specific center is on the ice, that player has a +5.0 Rel CF%, indicating they are significantly driving play despite a poor environment.2
* **Corsi Close and Score Effects:** Teams leading in a game tend to play conservatively ("turtle"), protecting the lead rather than attacking, while trailing teams push aggressively. This phenomenon, known as "score effects," distorts raw Corsi numbers. "Corsi Close" filters the data to include only situations where the game is within one goal in the first two periods or tied in the third, providing a purer measure of a team's true talent level absent tactical shell-shock.3

### 2.2 Fenwick (USAT): The Unblocked Horizon

Named after blogger Matt Fenwick, this metric refines Corsi by removing blocked shots from the equation. The NHL refers to this as **USAT (Unblocked Shot Attempts)**.

Definition and Logic

Fenwick operates on the theory that shot blocking is a distinct skill (or tactical choice) separate from possession. Furthermore, blocked shots do not reach the goaltender and therefore have a near-zero probability of becoming goals. By filtering them out, Fenwick provides a clearer picture of scoring potential.

$$\text{Fenwick} = \text{Goals} + \text{Saves} + \text{Missed Shots}$$

Strategic Application

Fenwick is frequently utilized as the denominator in "Shooting Percentage" calculations for advanced models because it represents the true set of "intended" shots that beat the first layer of defense. It is often viewed as a better predictor of future goal scoring than Corsi because it correlates more strongly with actual scoring chances.3

### 2.3 PDO (SPSV%): The Regression Indicator

While not a possession metric, PDO is intrinsically linked to the evaluation of possession stats. It acts as the "luck meter" of hockey analytics.

Calculation

PDO is the sum of a team's on-ice Shooting Percentage (Sh%) and on-ice Save Percentage (Sv%) at 5-on-5.

$$\text{PDO} = (\text{On-Ice Sh\%} \times 100) + (\text{On-Ice Sv\%} \times 100)$$

The Theory of Regression

Over a sufficiently large sample size (e.g., a full season or multiple seasons), the league average shooting percentage plus the league average save percentage must equal 100% (or 1000, depending on the scale). This is a mathematical certainty because every shot on goal is either a goal or a save.

* **High PDO (>102):** A team or player with a PDO significantly above 100 is considered "lucky." They are likely benefiting from unsustainably hot goaltending or a shooting bender. Analytics suggest these teams will regress downward.
* **Low PDO (<98):** Conversely, a low PDO suggests misfortune—hitting posts, suffering from cold goaltending, or bad bounces. These teams are prime candidates for a bounce-back, or positive regression.5

## 3. The Quality Revolution: Expected Goals (xG) Models

As the analytics community matured, it became clear that treating all shot attempts as equal (the fatal flaw of Corsi) was insufficient. A shot from the blueline has a historically low conversion rate (roughly 2-3%), while a rebound shot from the slot may convert at 30% or higher. To quantify this discrepancy, the **Expected Goals (xG)** model was developed.

xG is a probabilistic model that assigns a value between 0 and 1 to every unblocked shot attempt, representing the likelihood that the shot will result in a goal based on historical precedence.

### 3.1 Mathematical Architecture: Logistic Regression vs. Gradient Boosting

Modern xG models typically utilize **Logistic Regression** or **Extreme Gradient Boosting (XGBoost)**.

* Logistic Regression: Useful for binary outcomes (Goal/No Goal). It maps the input features to a sigmoid function, outputting a probability between 0 and 1.  
    
  $$P(\text{Goal}) = \frac{1}{1 + e^{-(\beta\_0 + \beta\_1 x\_1 + \beta\_2 x\_2 + \dots + \beta\_n x\_n)}}$$
* **Gradient Boosting:** Techniques like XGBoost are increasingly popular because they handle non-linear relationships better (e.g., the value of a shot might increase with proximity but then decrease if the angle becomes too acute, a non-linear interaction).

### 3.2 The Feature Set: Variables Defining Shot Quality

The accuracy of an xG model depends entirely on the granularity of its inputs. The "brainstorm big" approach to feature engineering has led to models that incorporate dozens of distinct variables.

| **Variable Category** | **Feature Name** | **Definition & Impact on Probability** |
| --- | --- | --- |
| **Spatial Geometry** | **Shot Distance** | The Euclidean distance from the shot origin to the center of the net. This is the single strongest predictor of goal probability; value decays exponentially as distance increases. |
|  | **Shot Angle** | The angle formed between the shot origin and the central line of the rink. Acute angles (dead angle shots) have significantly lower xG values than central slot shots.6 |
|  | **Venue Adjustment** | Adjustments applied to coordinates to correct for arena-specific bias (e.g., scorers at Madison Square Garden historically recording shots closer to the net than reality). |
| **Contextual State** | **Shot Type** | Classification of the mechanical action: Wrist Shot, Slap Shot, Snap Shot, Backhand, Tip-In, Deflection, Wrap-around. Tip-ins and deflections typically carry higher xG weights due to the erratic nature of the puck.8 |
|  | **Game State** | The score differential and home/away status. Trailing teams often face "shell" defenses that may allow perimeter shots but protect the slot, altering the conversion probability.6 |
|  | **Strength State** | 5v5, 5v4 (PP), 4v5 (SH), Empty Net. A shot taken on a Power Play has a higher xG than an identical shot at 5v5.7 |
| **Temporal Dynamics** | **Time Since Last Event** | The time elapsed (in seconds) between the shot and the immediately preceding event. Short intervals suggest rebounds or quick-transition plays, which increase xG.4 |
|  | **Rebound Flag** | A boolean feature indicating if the shot occurred within X seconds (often 2 or 3 seconds) of a previous shot. Rebounds are among the highest-value shots in hockey.4 |
|  | **Rush / Speed** | Calculated by measuring the distance between the previous event (e.g., a pass in the neutral zone) and the shot, divided by the time elapsed. High values indicate a "Rush" chance.8 |
|  | **Angle Change** | The difference in angle between the shot and the preceding pass or shot. This quantifies lateral movement (the Royal Road concept). Large angle changes drastically increase xG by forcing the goalie to move East-West.4 |
| **Model Corrections** | **Flurry Adjustment** | A discount factor applied to rapid-fire shots in a "scrum." If a player hacks at a loose puck three times in one second, counting that as 3.0 xG would be erroneous. The model discounts subsequent shots in a flurry.4 |

### 3.3 Post-Shot Expected Goals (xGOT)

While standard xG measures the quality of the *opportunity* (Pre-Shot), **Expected Goals on Target (xGOT)** measures the quality of the *execution* (Post-Shot). xGOT incorporates the end coordinates of the puck (e.g., top corner vs. chest logo). If xGOT > xG, the shooter added value through placement. This is the primary denominator for evaluating goaltender performance (GSAx).9

## 4. The Grand Unification: Player Valuation Models (WAR, RAPM, Game Score)

The Holy Grail of sports analytics is a single number that encapsulates a player's total value.

### 4.1 Regularized Adjusted Plus-Minus (RAPM)

Before calculating WAR, analysts must isolate a player's impact from their context (teammates, opponents, zone starts). **RAPM** is the gold standard technique for this isolation.

The Problem of Multicollinearity:

In hockey, players always appear in units (lines/pairs). If Player A always plays with Player B, a simple regression cannot distinguish who is driving the results.

The Solution: Ridge Regression:

RAPM uses Ridge Regression (L2 Regularization). This statistical technique adds a penalty term to the regression equation that shrinks coefficient estimates towards zero. This handles the multicollinearity of teammates and stabilizes the results, preventing outliers caused by small sample sizes.

The Regression Equation:

The target variable (e.g., xG/60) is modeled against a matrix of dummy variables:

$$Y = \beta\_0 + \beta\_{player}X\_{player} + \beta\_{teammates}X\_{teammates} + \beta\_{opponents}X\_{opponents} + \beta\_{zone}X\_{zone} + \beta\_{score}X\_{score} + \dots$$

The resulting coefficients ($\beta$) represent the isolated impact of that specific player on the target metric, holding all other variables constant.

### 4.2 Goals Above Replacement (GAR) & Wins Above Replacement (WAR)

GAR Components:

Using RAPM-derived coefficients, the Evolving-Hockey GAR model aggregates value from six components:10

1. **Even-Strength Offense (EVO):** Impact on xG For and Goals For.
2. **Even-Strength Defense (EVD):** Impact on xG Against and Goals Against.
3. **Power Play Offense (PPO):** Impact on scoring while up a man.
4. **Shorthanded Defense (SHD):** Impact on suppression while down a man.
5. **Penalties Taken:** Goal value of putting the team shorthanded (negative value).
6. **Penalties Drawn:** Goal value of putting the team on the PP (positive value).

Replacement Level:

"Replacement level" is defined as the performance level of a player readily available on the waiver wire (e.g., the 13th forward or 7th defenseman).11

WAR Conversion:

GAR is converted to WAR using a specific factor, typically around 5 to 6 Goals = 1 Win.

### 4.3 Game Score and GSVA

Game Score measures single-game productivity using weighted box-score stats.

The Formula (Dom Luszczyszyn):

$$\text{GS} = (0.75 \times \text{G}) + (0.7 \times \text{A1}) + (0.55 \times \text{A2}) + (0.075 \times \text{SOG}) + (0.05 \times \text{BLK}) + (0.15 \times \text{PenDiff}) + (0.01 \times \text{FODiff}) + (0.05 \times \text{CFDiff}) + (0.15 \times \text{GFDiff})$$

Note the heavy weight on Goals (0.75) vs. Shots (0.075) and the inclusion of Corsi Differential (0.05) to reward possession.12

GSVA (Game Score Value Added):

This aggregates Game Score over a season, applying age curves and regression to the mean to project future value.12

## 5. Network Analysis and Spatial Topology

Beyond individual metrics, advanced analysis now treats the team as a network of nodes (players) and edges (passes).

### 5.1 Centrality Measures in Passing Networks

By modeling the team as a graph, analysts can identify the true "conductors" of the offense.

* **Betweenness Centrality:** Measures how often a player lies on the shortest path between two other players. A player with high Betweenness is a critical "bridge"—the puck *must* go through them to transition from defense to offense.
* **Closeness Centrality:** Measures how few steps it takes for a player to reach everyone else in the network. High values indicate a player well-connected to the entire unit.
* **PageRank Centrality:** Adapted from Google's algorithm, this rates a player's importance based on the importance of the players they pass to.

### 5.2 The Royal Road: Geometry of the Cross-Seam Pass

The "Royal Road" is an imaginary line splitting the offensive zone into East and West halves.

* **Green Shots (High Danger):** Shots preceded by a pass across the Royal Road. This forces the goalie to move laterally, breaking visual attachment. Green shots have a shooting percentage of **~22%** vs **<3%** for Red Shots.13

### 5.3 xPass (Expected Pass Completion)

Models the probability of a pass being completed based on:

* **Coordinates:** Origin and Destination.
* **Defensive Pressure:** Distance to nearest defender.
* Lane Hygiene: Does the pass cross a stick or body?  
  Metric: Pass Completion Over Expected identifies elite playmakers who complete difficult, high-value passes.14

## 6. Microstats: The Granular Game

Microstats quantify the "little things" traditionally seen only by scouts.

### 6.1 Gap Control

A critical defensive metric measuring the distance between the defender and the puck carrier.

* **Metric:** *Gap Distance at Blue Line*.
* **Target:** A "tight gap" is often defined as **1 to 1.5 stick lengths**.
* **Gap Kill:** Closing the gap stick-on-stick before the defensive blue line to force a dump-in or turnover.

### 6.2 Puck Battle Win Rate

Using tracking data (like Sportlogiq) to measure loose puck recoveries.

* **Definition:** A "win" is awarded when a player emerges with possession from a contested situation (opponent within X feet).
* **Possession Driving Plays:** Combining Battle Wins with Controlled Exits.16

### 6.3 Zone Transition Details

* **Controlled Entry %:** Carry-ins + Passes / Total Entries. (Controlled entries generate ~2x more shots than dump-ins).17
* **Failed Exits:** A massive predictor of goals against. Tracking how often a defenseman's clearing attempt is blocked or intercepted.18

## 7. Goaltender Analytics: GSAx vs. GSAA

### 7.1 Goals Saved Above Average (GSAA)

Compares a goalie's Save % to the League Average Save %.

$$\text{GSAA} = (\text{League Sv\%} \times \text{Shots Faced}) - \text{Goals Allowed}$$

Flaw: It treats all shots as equal. A goalie facing 30 breakaway shots is treated the same as a goalie facing 30 dump-ins.

### 7.2 Goals Saved Above Expected (GSAx)

The superior metric. Compares Goals Allowed to xG Against.

$$\text{GSAx} = \text{xG Against} - \text{Goals Allowed}$$

Benefit: This isolates the goalie's performance from the team's defensive quality. A goalie with a positive GSAx on a bad team is truly elite.

### 7.3 Clear Sight Analytics (CSA)

Focuses on **Screen Types** (Flash vs. Layered) and **Pre-Shot Movement** (Royal Road).

* **Metric:** *Save % on High Danger Chances*.
* **Slot Line Performance:** Specific save % on plays crossing the center line.19

## 8. The New Era: NHL EDGE and Tracking Data

Powered by SMT (infrared tracking), generating XYZ coordinates 60x/second.

### 8.1 Velocity and Biometrics

* **Burst Speed:** Count of speed bursts over **20 mph** and **22 mph**. (Strong correlation with goal scoring, $R^2 > 0.65$ for 22+ mph bursts).20
* **Skating Distance:** Total miles skated (workload proxy).

### 8.2 Spatial Dominance

* **Inner Slot:** The high-danger triangle between the goal posts and faceoff hash marks. Accounts for ~52% of all goals.22
* **Possession Time:** True time the puck is on a player's stick (not just Corsi proxy).23

## 9. Data Architecture: Engineering the Analytics

### 9.1 Data Sources

* **NHL RTSS (Legacy):** statsapi.web.nhl.com. JSON event logs (Shot, Hit, Faceoff).
* **NHL EDGE (Modern):** API endpoints providing shift-level tracking data.

### 9.2 Key Feature Engineering

To build these stats, raw data must be transformed:

1. **Coordinate Normalization:** Fixing Rink X/Y so all offense flows one direction.24
2. Distance/Angle Calculation:  
     
   $$\text{Distance} = \sqrt{(89 - |x|)^2 + y^2}$$
3. **Score State:** Calculating differentials for "Score Adjustments."
4. **Shift Logic:** Parsing start/end times for "Per 60" rate calculations.

## Appendix A: Summary of Research Notes

The following is a categorized summary of the research notes utilized to compile this report:

**Group 1: Expected Goals (xG) & Shot Quality**

* **MoneyPuck & Stathletes Models:** Identify key variables: Shot distance, angle, rebound intervals, "Royal Road" (cross-seam) passes, and "Flurry" adjustments (discounting rapid-fire shots).
* **Methodology:** Shift from simple Logistic Regression to Gradient Boosting (XGBoost) for non-linear relationships.
* **xGOT:** Distinction between pre-shot probability (xG) and post-shot execution (xGOT/Shooting Goals Added).

**Group 2: Player Valuation (WAR/GAR/RAPM)**

* **Evolving-Hockey Model:** Defines WAR components (EVO, EVD, SHD, PPO, Pens). Uses Ridge Regression (RAPM) to solve the "multicollinearity" problem of teammates.
* **Game Score:** Dom Luszczyszyn's formula weights Goals (0.75) significantly higher than Shots (0.075), creating a single-game productivity score.
* **Replacement Level:** Defined as players outside the top 13 Forwards / 7 Defensemen.

**Group 3: Passing & Network Analysis**

* **Centrality Measures:** Application of Graph Theory (Betweenness, Closeness Centrality) to hockey passing networks to identify play-drivers who may not get assists.
* **xPass:** Modeling pass completion probability based on defensive pressure and lane geometry.

**Group 4: Microstats & Tracking**

* **Gap Control:** Defined as the distance between defender and carrier; "Gap Kill" is closing to stick-length before the blue line.
* **Puck Battles:** Sportlogiq metrics for contested loose puck recoveries.
* **NHL EDGE:** Biometric tracking including Burst Speed (20+ mph thresholds) and Skating Distance.

**Group 5: Goaltending**

* **GSAx vs GSAA:** GSAA uses league average Save%; GSAx uses Expected Goals (xG) to account for shot difficulty.
* **Clear Sight:** Importance of "Green Shots" (Royal Road passes) and Screen types (Flash vs. Layered).

## Appendix B: Bibliography

1. **NHL EDGE / Tracking Data:**
   * *NHL EDGE Glossary & Leaderboards* ([nhl.com/nhl-edge](https://nhl.com/nhl-edge))
   * *Apex Hockey: NHL EDGE Deep Dive* ([apexhockey.com/nhl-edge](https://apexhockey.com/nhl-edge))
2. **Expected Goals (xG) & Modeling:**
   * *MoneyPuck Glossary* ([moneypuck.com/glossary.htm](https://moneypuck.com/glossary.htm))
   * *Evolving-Hockey: xG Models* (evolving-hockey.com)
   * *Hockey-Graphs: xG Model with Pre-Shot Movement* (hockey-graphs.com)
3. **WAR / GAR / RAPM:**
   * *Evolving-Hockey: Goals Above Replacement* ([evolving-hockey.com/glossary/goals-above-replacement](https://evolving-hockey.com/glossary/goals-above-replacement))
   * *Hockey-Graphs: Wins Above Replacement* (hockey-graphs.com)
   * *Ridge Regression in Sports* ([ibm.com/think/topics/ridge-regression](https://ibm.com/think/topics/ridge-regression))
4. **Passing & Network Analysis:**
   * *Ryan Stimson's Passing Project* ([hockey-graphs.com/2015/12/18/passing-project-data-release-volume-i/](https://hockey-graphs.com/2015/12/18/passing-project-data-release-volume-i/))
   * *All Three Zones (Corey Sznajder)* (allthreezones.com)
   * *Centrality Measures in Sports* ([memgraph.com/blog/betweenness-centrality](https://memgraph.com/blog/betweenness-centrality))
5. **Goaltending:**
   * *Clear Sight Analytics* (csahockey.com)
   * *Goalie Coaches: GSAA vs GSAx* (goaliecoaches.com)
   * *Ingoal Mag: Royal Road* (ingoalmag.com)
6. **Game Score:**
   * *The Athletic / Dom Luszczyszyn* ([blueshirtsbreakaway.com/2018/03/29/hockey-lexicon-spotlight-series-game-score/](https://blueshirtsbreakaway.com/2018/03/29/hockey-lexicon-spotlight-series-game-score/))

#### Works cited

1. Advanced Stats For VGK Dummies: Corsi For Percentage - SinBin.vegas, accessed January 12, 2026, <https://sinbin.vegas/advanced-stats-for-vgk-dummies-corsi-for-percentage/>
2. Advanced Hockey Stats 101: Corsi (part 1 of 4) | by Christian Lee - Medium, accessed January 12, 2026, <https://medium.com/hockey-stats/advanced-hockey-stats-101-corsi-part-1-of-4-29d0a9fb1f95>
3. Analytics (ice hockey) - Wikipedia, accessed January 12, 2026, <https://en.wikipedia.org/wiki/Analytics_(ice_hockey)>
4. Glossary - MoneyPuck.com, accessed January 12, 2026, <https://moneypuck.com/glossary.htm>
5. ELI5: corsi and other advanced statistics? : r/hockey - Reddit, accessed January 12, 2026, <https://www.reddit.com/r/hockey/comments/29z5xz/eli5_corsi_and_other_advanced_statistics/>
6. Expected Goals (xG) in Hockey: The Complete Guide to NHL Shot Quality | HockeyStats.com, accessed January 12, 2026, <https://hockeystats.com/methodology/expected-goals>
7. Hockey Analytics – xG models v. 2.0 - Hockey-Statistics, accessed January 12, 2026, <https://hockey-statistics.com/2025/08/26/hockey-analytics-xg-models-v-2-0/>
8. Expected by Whom? A Skill-Adjusted Expected Goals Model for NHL Shooters and Goaltenders - arXiv, accessed January 12, 2026, <https://arxiv.org/html/2511.07703v2>
9. Introducing Expected Goals on Target (xGOT) - Stats Perform, accessed January 12, 2026, <https://www.statsperform.com/resource/introducing-expected-goals-on-target-xgot/>
10. Goals Above Replacement (GAR - Evolving-Hockey, accessed January 12, 2026, <https://evolving-hockey.com/glossary/goals-above-replacement/>
11. Wins Above Replacement: Replacement Level, Decisions, Results, and Final Remarks (Part 3) | Hockey Graphs, accessed January 12, 2026, <https://hockey-graphs.com/2019/01/18/wins-above-replacement-replacement-level-decisions-results-and-final-remarks-part-3/>
12. Hockey Lexicon Spotlight Series - Game Score - Blueshirts Breakaway, accessed January 12, 2026, <https://www.blueshirtsbreakaway.com/2018/03/29/hockey-lexicon-spotlight-series-game-score/>
13. The Most Important Line on the Ice You've Never Heard Of - OMHA, accessed January 12, 2026, <https://www.omha.net/news_article/show/486107-the-most-important-line-on-the-ice-you-ve-never-heard-of>
14. [PDF] Expected passes - Semantic Scholar, accessed January 12, 2026, <https://www.semanticscholar.org/paper/Expected-passes-Anzer-Bauer/1ece7b37dcb6bf8993f0d5dbacbf008f1d5ae2bb>
15. xPass 360: Upgrading Expected Pass Models - Hudl, accessed January 12, 2026, <https://www.hudl.com/blog/xpass-360-upgrading-expected-pass-xpass-models>
16. Sportlogiq Data Royale Bracket, accessed January 12, 2026, <https://www.sportlogiq.com/2020/04/07/elementor-2600/>
17. About - All Three Zones, accessed January 12, 2026, <https://www.allthreezones.com/about.html>
18. Player Cards/FAQ - All Three Zones, accessed January 12, 2026, <https://www.allthreezones.com/player-cardsfaq.html>
19. A Guide to the Data of Clear Sight Analytics (CSA) - InGoal Magazine, accessed January 12, 2026, <https://ingoalmag.com/2021/05/16/a-guide-to-the-data-of-clear-sight-analytics-csa/>
20. NHL EDGE Data Reveals the Link Between Skating Speed and Offensive Success - Apex Hockey, accessed January 12, 2026, <https://apexhockey.com/nhl-edge/>
21. Team Stat Leaders | NHL EDGE, accessed January 12, 2026, <https://www.nhl.com/nhl-edge/teams>
22. A Conversation with Sportlogiq - Apex Hockey, accessed January 12, 2026, <https://apexhockey.com/analytics/>
23. Sportlogiq Standouts, accessed January 12, 2026, <https://www.sportlogiq.com/2020/09/09/elementor-2489/>
24. danmorse314/hockeyR: Collect and Clean Hockey Stats - GitHub, accessed January 12, 2026, <https://github.com/danmorse314/hockeyR>